

# MARIE

*(Martian Radiation Environment Experiment)*



## **Experiment Description and Results**

The MARIE experiment is a payload on the 2001 Mars Odyssey Orbiter. The Mars 2001 Odyssey Project is part of an ongoing series of unmanned missions to Mars under the Jet Propulsion Laboratory's Mars Exploration Program. The Mars Exploration Program goals include the global observation of Mars, to enable understanding of the Mars climatic and geologic history, including the search for liquid water and the evidence of prior or extant life. The Mars 2001 Odyssey orbiter will carry scientific payloads that will determine surface mineralogy and morphology, provide global gamma-ray observations for a full Martian year, and study the Mars radiation environment during cruise and from orbit. In addition, the orbiter spacecraft will serve as a data relay for future landers. The orbiter science mission extends for 917 days. During the science mission, the orbiter will also serve as a communications relay for U.S. or international landers in 2003-2004. The orbiter will continue to serve as a telecommunications asset following the science mission; this relay-only phase extends for 457 days, for a total mission duration of 1374 days, or two Mars years. An additional Mars year of relay operations is planned, as a goal.

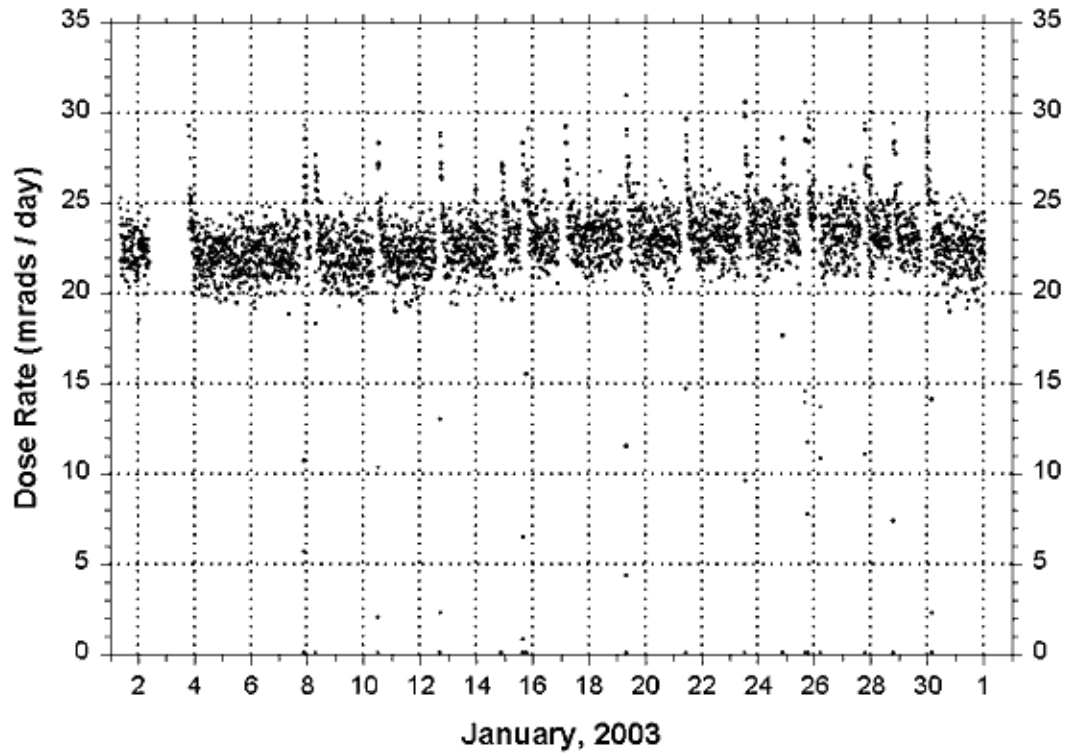
Information posted in this document has been compiled as a direct result of the MARIE project. Explanations will be provided and, depending upon the data, analysis may also be present.

For further information please see the MARIE website located at:

<http://marie.jsc.nasa.gov/>

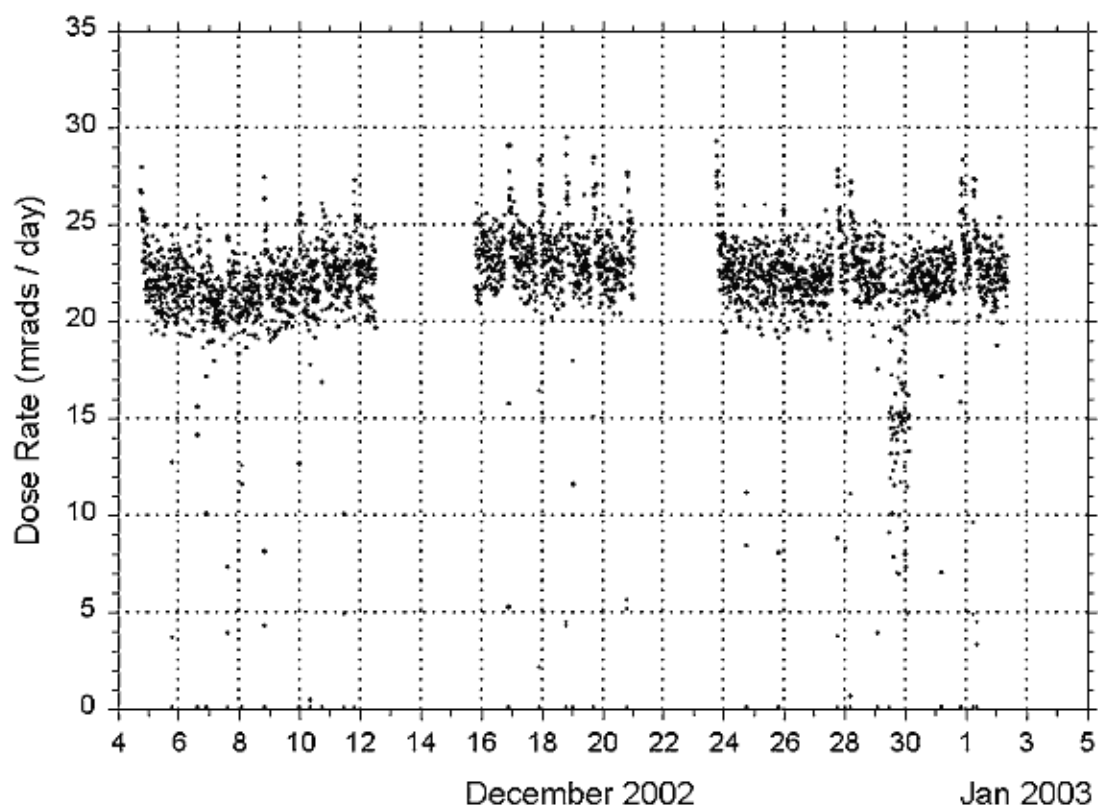
## Radiation Dose Plots

### MARIE Dose Rate Data January, 2003



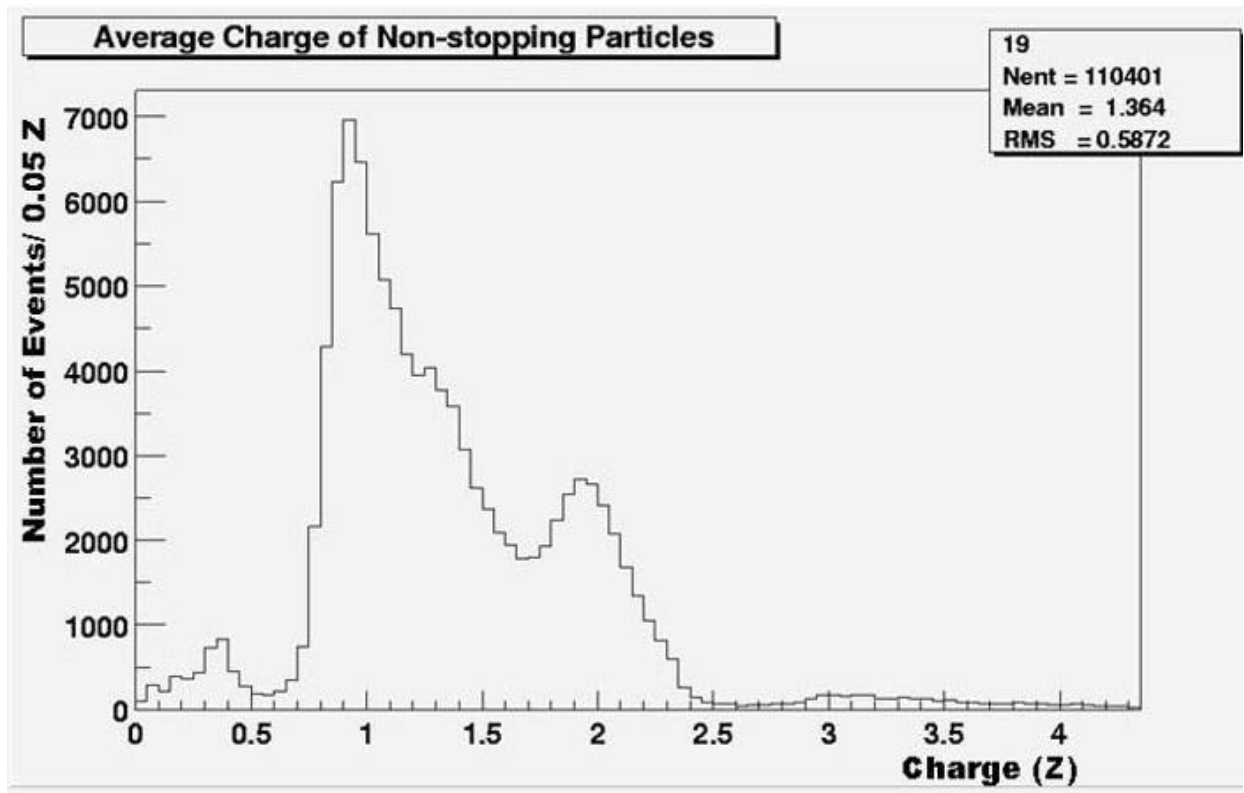
No solar particle events were observed by the MARIE instrument during the month. A slight rise in dose rate due to GCR is observed to take place during the latter half of the month, although it appears to drop back to a lower level just before the end of the month.

MARIE Dose Rate Data  
Dec 4, 2002 - Jan 3, 2003



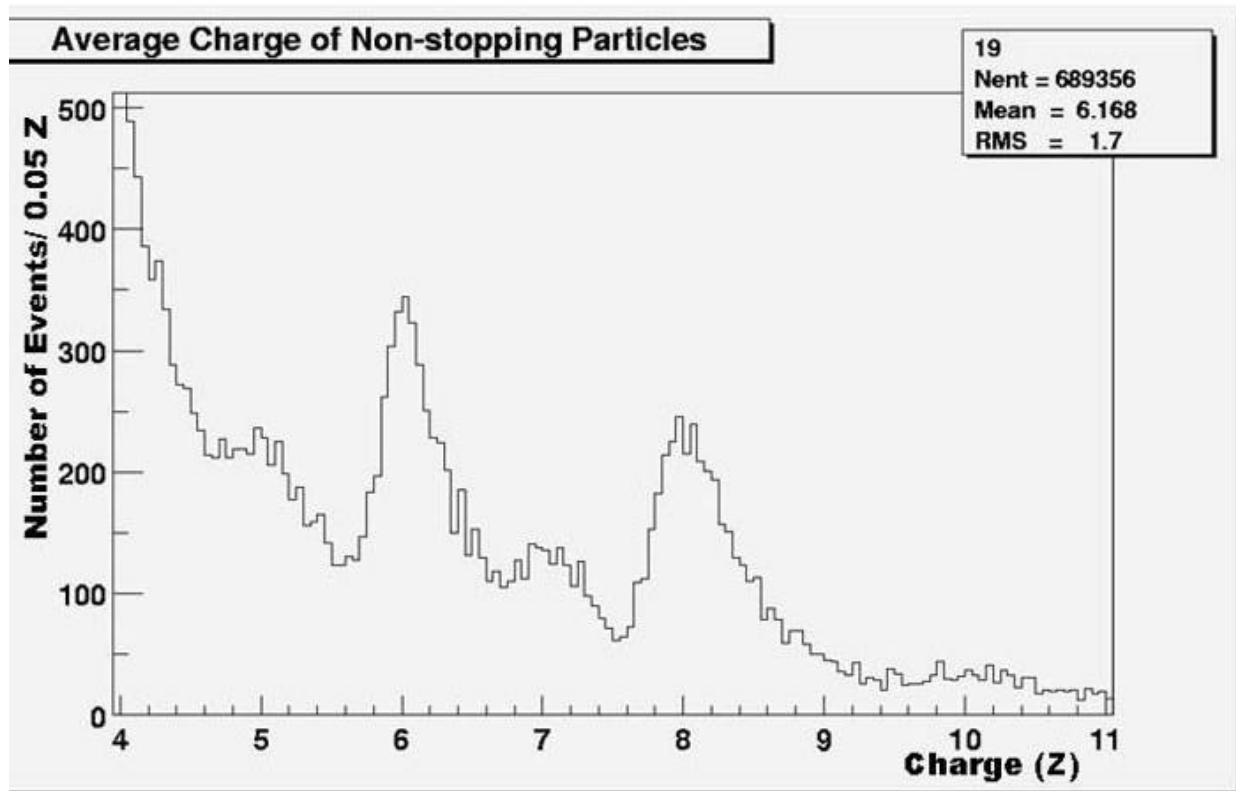
This is the MARIE observed dose rate data for the period December 4, 2002 to January 3, 2003. There were no clearly observed solar particle events during this period, although a slightly higher daily dose rate was observed during the middle of the month.

## Charge Plot 1



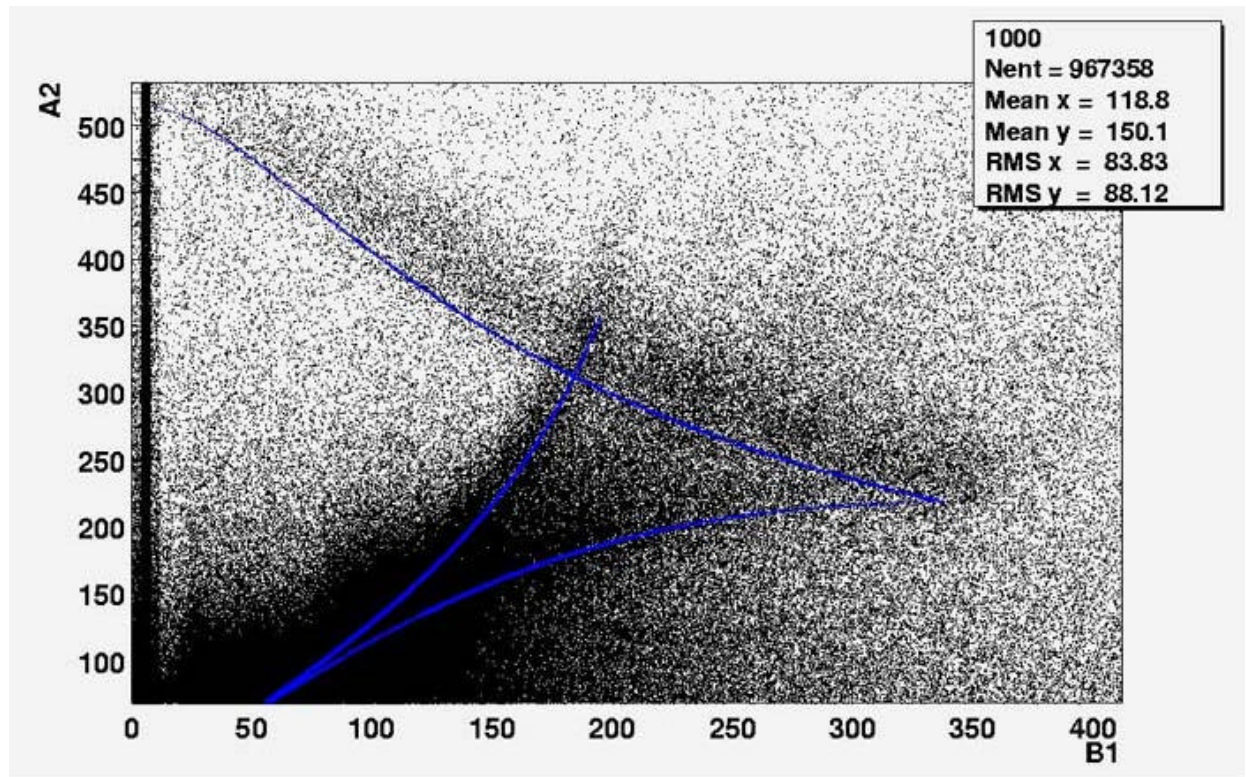
This figure shows the charge of the particles (those that passed through all the detectors) detected by the MARIE instrument. The peaks indicate protons (peak at 1) and helium nuclei (peak at 2). The charge value is calculated by averaging the charge measured from the B1, B2, and B3 detectors, since these detectors are currently calibrated the best. Later we will include all 6 detectors to improve the resolution.

## Charge Plot 2



This figure shows the charge of the particles (those that passed through all the detectors) detected by the MARIE instrument. The peaks indicate Carbon nuclei ( $Z = 6$ ), Nitrogen nuclei ( $Z = 7$ ), and Oxygen nuclei ( $Z = 8$ ). Boron nuclei ( $Z = 5$ ) can be seen, and there is a hint on Neon nuclei ( $Z = 10$ ). The charge value is calculated by averaging the charge measured from the B1, B2, and B3 detectors, since these detectors are currently calibrated the best. Later we will include all 6 detectors to improve the resolution.

## Raw Data Plot 1



This figure shows the raw values read out of the A2 and B1 detectors plotted against each other. The forward moving particles (those that move from the top of the MARIE instrument to the bottom, A1 - B4 detectors) produce what looks like a ">" sign. The curve that intersects the ">" sign is produced from the backward moving particles (B4 - A1 detectors). The blue line is the calculated results based on the geometry of the MARIE instrument for particles that move perpendicular to the detectors. The wide band seen in the data shows that particles come from all directions, which is expected since the Galactic Cosmic Rays (GCR's) are isotropically distributed throughout space.